

E I M A C
Division of Varian
SAN CARLOS
CALIFORNIA

592/3-200A3

MEDIUM-MU TRIODE

MODULATOR
OSCILLATOR
AMPLIFIER

The EIMAC 592/3-200A3 is a medium-mu power triode having a maximum plate dissipation rating of 200 watts, and it is intended for use as a power amplifier, oscillator, or modulator. It can be used at its maximum ratings at frequencies as high as 150 MHz.

Cooling of the 592/3-200A3 is accomplished by radiation from the plate, which operates at a visible red color at maximum plate dissipation, and by means of forced-air circulation around the envelope.

GENERAL CHARACTERISTICS

ELECTRICAL

Filament: Thoriated Tungsten

Voltage	10.0 volts
Current	5.0 amperes
Amplification Factor (Average)	25
Direct Interelectrode Capacitances (Average)	
Grid-Plate	3.3 $\mu\mu f$
Grid-Filament	3.6 $\mu\mu f$
Plate-Filament	0.29 $\mu\mu f$
Transconductance (I_b=200 ma., E_b=3000 v.)	3600 μmhos
Frequency for Maximum Ratings	150 MHz

MECHANICAL

Mounting	Vertical
Maximum Over-all Dimensions:	
Length	6.0 inches
Diameter	$3\frac{13}{32}$ inches
Net Weight (approx.)	6 ounces
Shipping Weight (approx.)	1½ pounds
Cooling	Radiation and Forced-Air
Recommended Heat Dissipating Connectors:	
Plate	EIMAC HR-10
Grid	EIMAC HR-5
Maximum Bulb Temperature	225°C
Maximum Seal Temperature	175°C

AUDIO FREQUENCY POWER AMPLIFIER AND MODULATOR

Class B

MAXIMUM RATINGS

DC PLATE VOLTAGE	3500 VOLTS
MAX-SIGNAL DC PLATE CURRENT	250 MA.
DC PLATE CURRENT	200 WATTS
GRID DISSIPATION	25 WATTS

TYPICAL OPERATION
Sinusoidal wave, two tubes unless otherwise specified.

DC Plate Voltage	2000	2500	3000 Volts
DC Grid Voltage (approx.)*	—50	—70	—90 Volts
Zero-Signal DC Plate Current	120	100	80 Ma.
Max-Signal DC Plate Current	500	450	400 Ma.
Effective Load, Plate-to-Plate	8500	12,600	18,000 Ohms
Peak AF Grid Input Voltage (per tube)	260	270	270 Volts
Max-Signal Peak Driving Power	50	52	40 Watts
Max-Signal Nominal Driving Power (approx.)	25	26	20 Watts
Max-Signal Plate Power Output	600	725	820 Watts

*Adjust to give stated zero-signal plate current.

PLATE MODULATED RADIO FREQUENCY AMPLIFIER

Class-C Telephony (Carrier conditions, per tube)

MAXIMUM RATINGS

DC PLATE VOLTAGE	2600 VOLTS
PLATE DISSIPATION	200 MA.
PLATE DISSIPATION	130 WATTS
GRID DISSIPATION	25 WATTS

TYPICAL OPERATION

DC Plate Voltage	2000	2500 Volts
DC Plate Current	200	200 Ma.
DC Grid Voltage	—250	—300 Volts
DC Grid Current	35	35 Ma.
Peak RF Grid Input Voltage	480	535 Volts
Driving Power	17	19 Watts
Grid Dissipation	8	9 Watts
Plate Power Input	400	500 Watts
Plate Dissipation	115	125 Watts
Plate Power Output	285	375 Watts

The output figures do not allow for circuit losses.

RADIO FREQUENCY POWER AMPLIFIER AND OSCILLATOR

Class-C Telegraphy or FM Telephony
(Key-down conditions, per tube)

MAXIMUM RATINGS

DC PLATE VOLTAGE	3500 VOLTS
DC PLATE CURRENT	250 MA.
PLATE DISSIPATION	200 WATTS
GRID DISSIPATION	25 WATTS

TYPICAL OPERATION

DC Plate Voltage	2000	2500	3000	3500 Volts
DC Plate Current	250	228	222	228 Ma.
DC Grid Voltage	—150	—180	—220	—270 Volts
DC Grid Current	32	28	25	30 Ma.
Peak RF Grid Input Voltage	380	400	440	505 Volts
Driving Power	12	11	11	15 Watts
Grid Dissipation	7	6	5.5	7 Watts
Plate Power Input	500	570	666	800 Watts
Plate Dissipation	200	200	200	200 Watts
Plate Power Output	300	370	466	600 Watts

The output figures do not allow for circuit losses.

APPLICATION

MECHANICAL

Mounting — The 592/3-200A3 must be mounted vertically, base down or base up. Flexible connecting straps should be provided from the grid and plate terminals to the external grid and plate circuits. The tube must be protected from severe vibration and shock.

Cooling — An air-flow of approximately 15 cubic feet per minute should be directed at the bulb from a 2 inch diameter nozzle located about three inches from the center line of the tube. The center line of the nozzle should be located about two inches down from the top of the plate terminal. The incoming air temperature should not exceed 50°C. Other methods of cooling may be used provided the maximum bulb and seal temperatures are not exceeded. An 8 inch, household-type fan located about 10 inches from the tube is one alternate method. Special heat-dissipating connectors EIMAC HR-5 and HR-10, or equivalent, for grid and plate terminals respectively) should be used with this tube. These connectors help to prolong tube life by reducing the temperature of the metal-glass seals.

ELECTRICAL

Filament Voltage — For maximum tube life, the filament voltage, as measured directly at the filament pins, should be the rated value of 10.0 volts. Unavoidable variations in filament voltage must be kept within the range of 9.5 to 10.5 volts.

Bias Voltage — There is little advantage in using bias voltages in excess of those given under "Typical Operation" except in certain very specialized applications. Where bias is obtained by a grid leak, suitable protective means must be provided to prevent excessive plate dissipation in the event of loss of excitation.

Grid Dissipation — The power dissipated by the grid of the 592/3-200A3 must not exceed 25 watts. Grid dissipation may be calculated from the following expression:

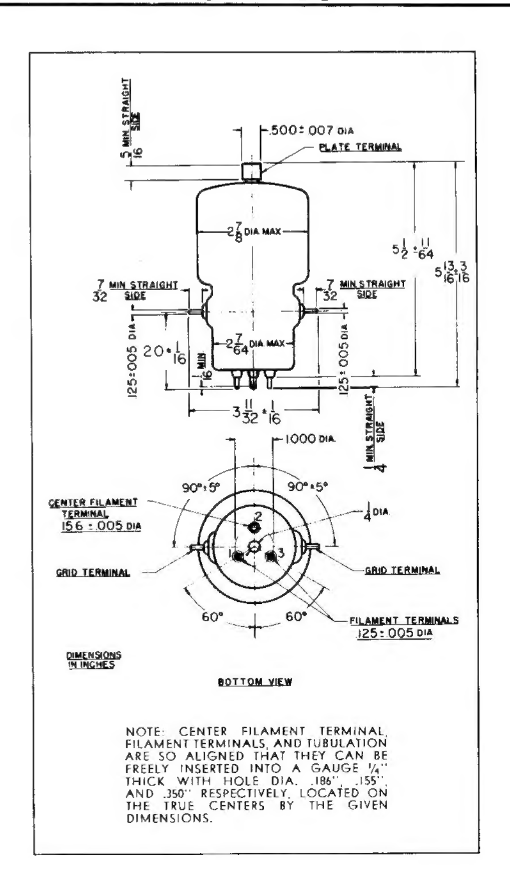
$$P_g = e_{cmp} I_c$$

where P_g=grid dissipation,
e_{cmp}=peak positive grid voltage, and
I_c=dc grid current.

e_{cmp} may be measured by means of a suitable peak-reading voltmeter connected between filament and grid.

Plate Voltage—Except for special applications, the plate supply voltage for the 592/3-200A3 should not exceed 3500 volts. In most cases there is little advantage in using plate-supply voltages in excess of those given under "Typical Operation" for the power output desired.

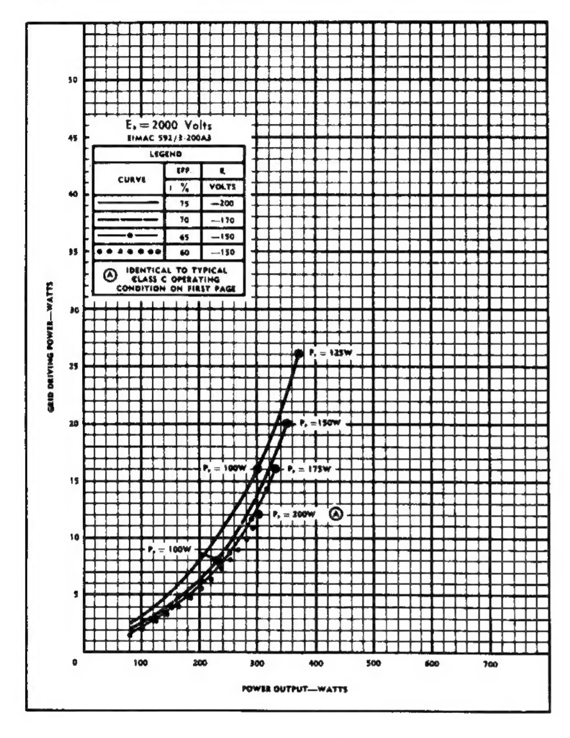
Plate Dissipation — Under normal operating conditions, the power dissipated by the plate of the 592/3-200A3 should not exceed 200 watts. At this dissipation the brightness temperature of the plate will appear a red-orange in color. The value of this color is somewhat affected by light from the filament, as well as from external sources. Plate dissipation in excess of the maximum rating is permissible for short periods of time, such as during tuning procedures.

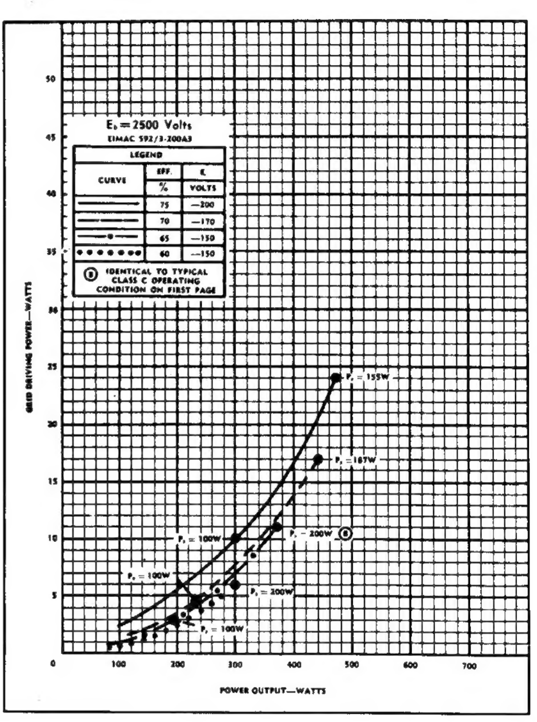


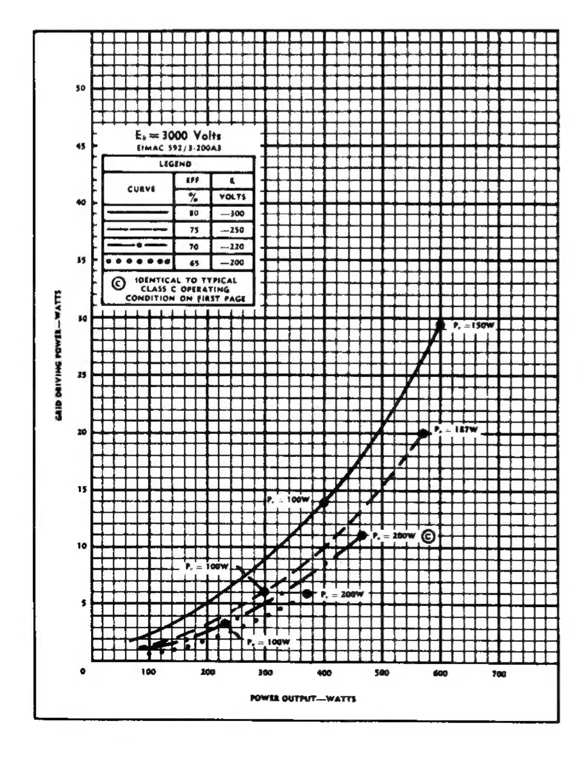
DRIVING POWER vs. POWER OUTPUT

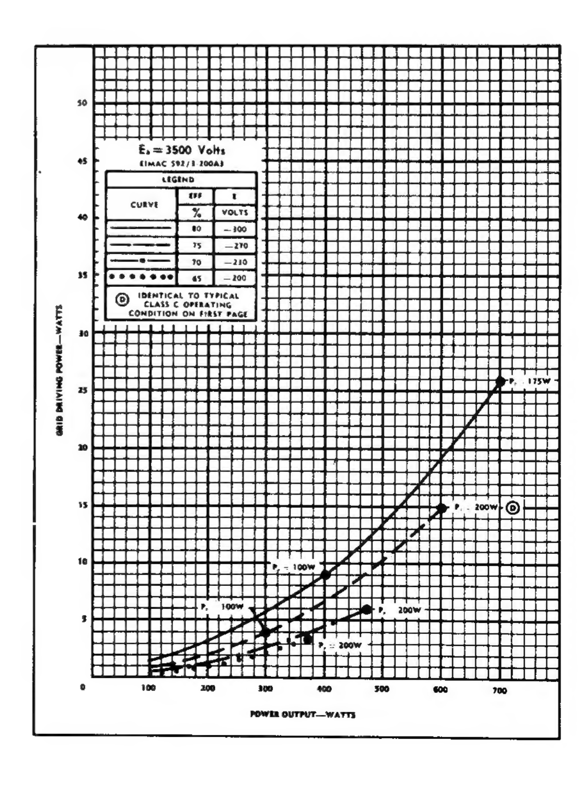
The four charts on this page show the relationship of plate efficiency, power output and grid driving power at plate voltages of 2000, 2500, 3000 and 3500 volts. These charts show combined grid and bias losses only. The driving power and power output figures do not include circuit losses. The plate dissipation in watts is indicated by P_p.

Points A, B, C, and D are identical to the typical Class C operating conditions shown on the first page under 2000, 2500, 3000, and 3500 volts respectively.









EIMAC 592/3-200A3
CONSTANT CURRENT
CHARACTERISTICS

PLATE CURRENT - AMPERES

1.8 1.6 1.4 1.2 1.0 .800 .600 .400 .200 .100 .020

GRID CURRENT - AMPERES

.020 .060 .100 .200 .300 .400 .500 .600

PLATE VOLTAGE

500 1000 1500 2000 2500 3000 3500 4000 4500 5000

GRID VOLTAGE

600 500 400 300 200 100 0 100 200 300 400

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